can be judged whether problems in drinking water treatment are related to the presence of methane in groundwater. [1] Eller et al. (2001) FEMS Microbiol. Letters 198, 91-97.

169(A)

ACTION OF A CATIONIC SURFACTANT ON THE ACTIVITY AND REMOVAL OF BACTERIAL BIOFILMS FORMED UNDER DIFFERENT FLOW REGIMES

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This study investigates the antimicrobial activity of a cationic surfactant cetyltrimethylammonium bromide (ctab) on mature *pseudomonas fluorescens* biofilms, grown in either laminar or turbulent flow. the action of ctab was assessed by means of the biofilm respiratory activity and the loss of biofilm mass. the biofilm structure damage caused by ctab application was inspected using sem. the physical stability of the biofilm was evaluated through the variation of the mass of the biofilm after submission to a series of different rotation velocities. in order to characterize the variation in the susceptibility to the surfactant, the antimicrobial effect of ctab was also investigated with planktonic cells by measuring the bacterial respiratory activity and atp released, and the effect of a protein (bsa) as an interfering substance. the planktonic tests showed that ctab was bactericidal against *p. fluorescens* since it caused total bacteria inactivation for the higher concentrations tested. nevertheless, that bactericidal activity was significantly reduced when bsa was added to the suspended cultures. further results indicated that ctab also promoted the release of the intracellular atp. this leakage of intracellular component may be a sign of the disruption of the outer membrane of the bacteria emphasizing that, in some extent, membrane damage may account for, at least, the mode of antimicrobial action of this surfactant. concerning biofilm tests, ctab acted differently in biofilms formed under laminar and turbulent conditions: laminar biofilms were more susceptible to ctab than those formed under turbulent flow. however, total respiratory inactivation was not achieved in all situations tested, conversely to the planktonic situation, emphasizing the possible protective action of the polymeric matrix of the biofilm. furthermore, ctab appeared to cause little effect on the removal of biofilms from the metal surface. sem observations highlighted that the bacteria entrapped in the biofilm, after ctab application, seems to loose, in same extent, their typical morphological structure, which reinforces the atp results. the biofilm physical stability tests showed that only with the synergistic combination of higher surfactant concentrations and high shear forces was possible to achieve the most efficacious mean to promote biofilm detachment.

170(B)

ATTACHMENT OF THE *BACILLUS ANTHRACIS* SPORE TO DRINKING WATER PIPE BIOFILM

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Tolerance of the *Bacillus anthracis* spore to environmental stress renders the pathogen a candidate for terrorist activities that could threaten national security. Although drinking water contaminated with *B. anthracis* spores could pose a threat to public health, the fate of the pathogen deliberately released into municipal drinking water systems is not understood. Spores of the pathogen introduced to drinking water systems could evade water treatment, traverse the pipe distribution network, and ultimately reach the consumer tap. To understand the fate of the pathogen in the pipe distribution system, *B. anthracis* spores were introduced to drinking water pipes to assess attachment of the pathogen to pipe surface biofilm. The investigation employed biofilms created in a system of copper pipe segments (1.4-cm diameter, 30-cm length) connected in parallel to receive a regulated flow of municipal chlorinated drinking water. Following biofilm formation, pipe segments received dormant *B. anthracis* spores (ATCC strain 4229) suspended in chlorinated tap water as a recirculating laminar flow (50 ml per minute) to determine rates of spore attachment to pipe inner surface. As a comparative control, spore suspensions were also delivered to copper pipe segments that did not have biofilm material. Attachment rates were derived using direct microscopic counts to quantify changes in spore density of bulk water as a function of time. Significant attachment of spores to pipe biofilm was demonstrated by about 50% and 85% spore attachment per pipe segment after 2 hours and 6 hours, respectively. By contrast, spore attachment to pipe segments without biofilm was about 5% and 20% after 2 hours and 6 hours, respectively. Thus, drinking water biofilm could promote attachment of *B. anthracis* spores to pipe surfaces and contamination of a pipe distribution system. The association of the *B. anthracis* spore with pipe biofilm should be considered for predicting and controlling the transport of the biological agent through a drinking water pipe network.

171(C)

PILOT- AND LABORATORY-SCALE FACILITIES FOR THE INVESTIGATION OF BIOFILMS FORMED WITHIN AN URBAN WATER DISTRIBUTION SYSTEM

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The aim of the current study was to investigate the growth of biofilms formed in an urban water distribution system within the greater Stockholm area, Sweden.this project is a joint venture between stockholm water, the mistra program, the swedish institute of infectious disease control and the royal technical university, Stockholm. the lovö waterworks are responsible for the supply of water to approximately 350 000 consumers within the greater